An Integrated Approach to Community Care: Stay Up and Active in Orange County

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List of Abbreviations

ACS	American College of Surgeons
ALS	Advanced Life Support
CDC	Centers for Disease Control and Prevention
C-Spine	Cervical Spine
ED	Emergency Department
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
NHTSA	National Highway Traffic Safety Administration
OCDoA	Orange County Department on Aging
OCES	Orange County Emergency Services
SOG	Standard Operating Guideline
SUAA	Stay Up and Active Program
STEADI	Stopping Elderly Accidents, Deaths & Injuries
TBI	Traumatic Brain Injury
TSCI	Traumatic Spinal Cord Injury
UNC	University of North Carolina at Chapel Hill
WebEOC	Online emergency incident management technology

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Manuscript

Abstract

Introduction: Falls amongst persons over 60 present a significant risk for serious injury or decline in health status. After a first fall, persons generally suffer from repeat falls without intervention at some level. Citizens of Orange County, North Carolina experience the same negative outcomes from falls as the rest of the global population, including physical injury, emotional trauma, and economic difficulties. These falls place significant burdens on Emergency Medical Services (EMS), local hospitals, and the adults themselves. Recognizing a need exists to provide interventions to minimize risk, Orange County EMS, the Orange County Department on Aging (OCDoA), and the University of North Carolina at Chapel Hill (UNC) partnered to create the Stay Up and Active Program (SUAA).

Hypothesis/Problem: This program attempts to connect Orange County citizens at risk of falls through Orange County EMS services by screening any patient qualifying for inclusion in SUAA. By partnering with OCDoA, this program is able connect and monitor participants to ensure changing needs are addressed.

Methods: Qualitative and quantitative techniques were used to pilot test the user interface between partnering organizations.

Results: In the first seven months of the program, 478 positive screenings for falls risk were collected. Only 16.7% of these screenings were from patients who resided in assisted living facilities. There were 55 individuals that received a positive screening more than one time and the maximum number of positive screenings by one individual

was fourteen. More positive screenings came from women (61.3%) than men (38.7%) and the most positive screenings came from individuals 88 years of age (6.9%).

Conclusion: There are numerous barriers present when attempting to implement a community falls prevention program. This program has identified several challenges to connect older adults with services that are already available to keep them independent in the home. The barriers identified within Orange County have provided insight to all stakeholders regarding the factors that inhibit the program's success. Falls pose a significant risk to citizens in Orange County and program evaluation should continue to provide suggestions for improvement and ensure sustainability.

Introduction

Growing in impact on the healthcare community in the past two decades, falls in older adults comprise a significant portion of healthcare expenditures and resource use in the United States. Over 660,000 hospitalizations occurred in the United States in 2010 for traumatic brain injury (TBI) in adults over 65 and accidental falls accounted for the single greatest cause of these injuries (CDC, 2013). Falls occur in one of every three older adults per year, accounting for approximately 12 million falls every year (National Council on Aging, 2014). These falls represented approximately $30 billion in direct medical costs and led to 21,700 deaths among older adults (CDC, 2013). At local, state, and national levels, falls among older adults pose a threat to the current health care system with the aging baby boomer population reaching retirement age in the coming decade.

North Carolina, currently ranked 5th amongst the United States in the greatest number of older adults, is particularly concerned by this public health issue. It is estimated that by 2030, 75 of North Carolina's 100 counties will have more people per county over the age of 65 than any other age group (North Carolina Department of Health and Human Services, 2012). Orange County, North Carolina is situated in the central region of the state and is made up of approximately 400 square miles. The county is home to several towns including Chapel Hill, Carrboro, and Hillsborough. The University of North Carolina at Chapel Hill (UNC), along with the UNC Hospitals System, are located in the southern part of the county in a more urban setting, while the northern part of the county is mostly rural with a significantly lower population density. The area has gained popularity with retirees and is the home of five large retirement communities as well as several assisted living and skilled nursing facilities (Orange County Department on Aging, 2012).

Orange County EMS is the sole provider of Advanced Life Support (ALS) services in the county. The EMS Division consists of 75 full-time and 20 part-time employees and staffs between five to eight ambulances throughout any given day. All ambulances are staffed by at least one Paramedic and one Emergency Medical Technician (EMT)-Basic. In addition, there is one supervisor and one assistant supervisor per shift, both of whom are Paramedics. Orange County EMS began tracking EMS calls classified as falls-related in 2010. Between 2010-2013, the EMS Division averaged 10,384 calls for service per year (Orange County 9-1-1, 2014). These data include both lifting assistance EMS calls (where a person needs help transferring from a bed to a chair or similar situation and has not actually fallen), which averaged 97 (0.9%) calls per year, and fall specific responses, which averaged 1,112 (10.7%) calls per year, for a combined average of 11.6% over the four year period; these data are summarized in Table 1 (Orange County 9-1-1, 2014). During the period of 2010-2013, there was no tracking to identify repeat fall victims that utilized an EMS ambulance for transport or non-transport purposes.

The mission of the Orange County Department on Aging (OCDoA) is to provide, "Integrated aging services through state of the art senior centers…to educate seniors and their families and maximize the health, well-being, community engagement, and independence of older adults" (Orange County Department on Aging, 2014a). The OCDoA provides direct services to approximately 145 people per year and spends an average of 150 hours per month providing information and case assistance to citizens (Orange County Department on Aging, 2014b). The Aging Transitions Unit, a group within the OCDoA, serves the entire Orange County population of approximately 134,000 citizens. With an annual budget of $355,000 drawn from local, state, and federal sources, the Aging Transitions Unit employs five full-time

employees and several part-time employees to provide in-home assessments, caregiver referral, low-cost support services, and other age-related services to citizens.

In North Carolina, there were approximately 193,000 Emergency Department (ED) visits as a result of unintentional falls in 2012 (North Carolina Injury & Violence Prevention Branch, 2014). About 15% (900) of these falls resulted in deaths, constituting a 74.5% increase from 1999 to 2012 (North Carolina Injury & Violence Prevention Branch, 2014). The typical EMS response to a fall call is to stabilize the patient's cervical spine (C-Spine); spinally immobilize the patient on a long spine board in order to reduce the risk of spinal injury by limiting movement; and transport the patient to the appropriate hospital. These procedures are frequently painful to patients who may be suffering from chronic back problems and pose a risk of bruising or other injury to the patients when hospital transport times are extended. Based on published clinical practice guidelines, there are several risk factors that increase a person's chance for falling that should be assessed and addressed to prevent future falls from occurring. These factors include: individuals limiting their mobility for fear of falling, hence a reduction in physical fitness; polypharmacy, or drug interactions due to a high number of prescribed medications; and improper use of a prescribed or over-the-counter walking aid (American Geriatrics Society, n.d.).

The opportunity to educate EMS about fall prevention and to leverage the "first responder" relationship with older adults was the inspiration for the Stay Up and Active Program (SUAA). This program aims to reduce the incidence of falls in citizens of Orange County who are over the age of 60. At the inception of SUAA, no community falls prevention program was active within the county nor did an effort include Orange County EMS. As Orange County EMS providers are frequently the first care givers in any fall, this agency is well positioned to link the

at-risk population with the services and resources provided by the OCDoA. This program represents the first time EMS formally collaborated with the Department on Aging to meet a need in the community. By partnering local agencies together, this program uses existing relationships and institutional knowledge to facilitate implementation.

Initial discussions between the OCDoA, Orange County Emergency Services (OCES), and UNC supported that an EMS-centric model would be optimal for a community falls prevention program due to several factors. EMS is frequently the first in a long line of healthcare providers for older adults during an accident. Additionally, EMS providers have the opportunity to obtain accurate and complete histories from the older adults and possible bystanders on scene, and can assess the older adult's safety in their environment. Collaboration among these groups was agreed to initiate SUAA with OCES to be the initial point of contact with potential at risk individuals, given the existing coordination of electronic records to facilitate access to patient care records and reporting in support of the program.

Methods

Development of Workflow

Given OCDoA's population focus, this program included any adult 60 years of age or older in Orange County who received EMS support resulting from a call for service. An algorithm was developed by both organizations to identify the level of risk and appropriate intervention (Figure 1).

Upon arrival at the scene of the emergency and during the course of the patient assessment, EMS providers would screen patients over the age of 60 they suspected of being at risk for falls using the following three evidence-based criteria from the AGS Clinical Practice Guidelines questions (American Geriatrics Society, n.d.):

- Are you worried that you are going to fall?
- Have you fallen in the past year?
- Are you unsteady when walking or standing?

If any of the above questions elicited a "Yes" response from the patient, they screened "positive" and would receive a follow-up phone call from OCES. Any EMS provider, regardless of their certification level, was able to screen the patient to determine their falls risk. This screening was designed to supplement the standard patient assessment and was incorporated to be as least burdensome as possible for field EMS staff.

Following submission of the EMS field report that incorporated the three falls risk screening questions, reports were run weekly to identify patients screening positive. Those specific patients' names, contact information, and initial screening results were then entered into WebEOC (online emergency incident management technology) to track their status. Seventy-two hours following the initial EMS service call, a follow-up telephone call by OCES was initiated to schedule a home visit. The home visit consisted of a translation of the Centers for Disease Control's STEADI (Stopping Elderly Accidents, Deaths & Injuries) tool kit, an evidence-based fall risk management algorithm for clinicians (CDC, 2014). If no contact was made after three telephone call attempts, the patient record was closed. If contact was made, a home visit from EMS personnel would be scheduled. At the scheduled EMS home visit, the patient would be asked background information including current medications, medication history, and the current status of their health. Additionally, they would be screened for cognitive impairment via the Mini-Cog Assessment (Figure 2), depression via the PHQ-2 assessment (Figure 3), elder abuse, and vision impairment (CDC, 2014). The patient was then placed through a Timed Up and Go Test (Figure 4), the 30-Second Chair Stand (Figure 5), and 4-Stage

Balance Test Full Tandem Stance (Figure 6; CDC, 2014). Finally, an assessment would be performed of their current living conditions and any observed safety concerns or risk factors were discussed with the patient (Figure 7). The results of the EMS home visit were then entered into the appropriate WebEOC ticket.

Subsequent to a home visit from EMS and with approval from the patient, a referral is made for the patient to the OCDoA to connect them with the appropriate resources to stay independent in their home as long as possible. At the OCDoA follow-up, appropriate referrals were made for the patient that might include services such as occupational therapy, physical therapy, counseling, caregiver support group, in-home healthcare services and others.

Communication

In an effort to streamline communication and share findings, the assessments and referrals were then recorded in WebEOC by EMS (Figure 8) and by OCDoA (Figure 9) and used for participant monitoring. Following the completion of a WebEOC ticket, the initial EMS crews were notified of the outcome of OCES and OCDoA follow-up with the patients. These procedures are summarized in the Falls Prevention Standard Operating Guideline (SOG) available in Figure 10.

Evaluation

Specific indicators studied were: age; gender; repeat positive screening; and whether the patient resided in an assisted living facility or in a private residence. The program was evaluated by a team based at the UNC Chapel Hill Center for Aging and Health. The goal of the evaluation project was to assess the characteristics of the individuals who were calling EMS due to a fall, the risk factors associated with the fall, and the interventions prescribed by the OCDoA.

Prior to implementation, SUAA was reviewed by the UNC Office of Human Research Ethics Institutional Review Board as Study 13-2942 and was granted exempt status from further review as the submission did not constitute human subjects research under 45 CFR 46.102 (d or f) and 21 CFR 56.102(c)(e)(l). Additionally, no special funding was allocated nor was grant funding obtained to implement this program. All resources were obtained from preexisting sources within county offices. Any materials given to adult participants were free of charge and donated by relevant organizations.

Results

Between September 1, 2013 and March 31, 2014, there were a total of 478 instances of a patient screening positive using the Falls Risk Assessment criteria during a patient field assessment. Of these, there were a total of 55 unique individuals that had at least one repeat instance of screening positive as a result of a repeat 9-1-1 call. The range of repeat screenings by individual was between two and fourteen with 32 individuals experiencing a total of two positive screenings; available data are presented in Table 2. The age of patients screening positive during this program ranged from 60-99, with the most frequent being 88 years at 6.9%. Positive screenings are plotted by age of the patient in Figure 11. Of the patients that screened positive for falls risk, 66.1% (316 instances) were transported to an ED and the remaining 33.9% (162 instances) were non-transports either by Refusal or Referral. Males made up 38.7% of the positive screenings and women 61.3%. Only 16.7% (80 instances) of positively screened patients resided in nursing homes or assisted living facilities. Of patients that screened positive, accurate phone numbers were only recorded in 31% (148 instances) of the patient care reports. Of the patients contacted, ten agreed to a home visit by EMS; all ten agreed to further follow up from OCDoA.

Discussion

During the seven month study period, there were a total of 704 EMS calls for a fall and 37 EMS calls for "Lift Assistance" (Orange County 9-1-1, 2014). As evidenced by these figures, falls injuries place a significant burden on the EMS system in Orange County. While there is no information available from the four EDs to which OCES transports patients for subsequent services, the EMS unit hour utilization and ED bed time use expected as a result of these calls is worthy of attention. Additionally, while the transport rates for positively screened individuals indicates the need for more resources than solely transport to the ED, it is difficult for EMS field personnel to provide and coordinate resources for these patients during a critical care situation. During the launch period of the study, the falls screening questions were not applied to all patients that had fallen and missed a large number of potential participants in SUAA. This pointed out the need for more education and additional review of systems.

There were at total of 741 falls-related calls during the study period, but only 478 EMS patients screened positive for at-risk. As the falls risk assessment could be performed on any patient 60 or greater no matter what the nature of the call (Fall, Lift Assist, Chest Pain, Breathing Difficulty, etc.), it was expected that at least as many positive screenings would be recorded. Since this is not the case, further investigation is needed to determine and quantify whether or not all fall victims were screened or if they screened negative. If they are simply not being screened, then further training and emphasis will need to be placed on the necessity for asking the three falls risk assessment questions with field EMS staff. If the patients are screening negative, then evaluation of EMS recording and other potential areas of outreach need to be explored with this program.

In examining the demographics of the patients that screened positive, more women screened positive than men, consistent with the national data that shows women over 60 fall more frequently than men (CDC, 2013). The Orange County data do show, however, that there is no correlation between age and a positive falls screening. The most common age in Orange County for falls risk was 88 years, but otherwise, there was no ability to predict a person's risk based on age. EMS providers in Orange County anecdotally believe that more falls calls occur at assisted living facilities than at private residences. Based on the screenings performed by EMS, these data revealed that there were more people at risk for falling in private homes than in assisted living facilities. This could be a result of poor screening rates on behalf of providers, or due to policies and procedures in place by these facilities to reduce the risk of their tenants falling and the associated change in lifestyle and decreased mobility that comes with this option. During this initial phase of SUAA, patients that screened positive and lived in assisted living facilities were not contacted for follow-up due to barriers associated with policies in these institutions. This finding is inconsistent with epidemiologic data that shows a 50-75% chance of people in nursing homes falling every year and that there is up to a 200% chance a person in an assisted living facility will fall (CDC, 2012). In the next phase of SUAA, these facilities will be presented with the data collected in the pilot phase and work will commence to offer assistance to these facilities from all three agencies working on SUAA.

There were several barriers and limitations discovered during implementation of this program. Barriers fell into two categories: system-based change and older adults. Initially, information sharing to track participants who agreed to follow up was difficult. In response, the WebEOC boards were reviewed, modified, and republished to ensure ease of access and use for all agencies. A second barrier encountered was the poor phone number collection by field EMS

staff. Without an accurate phone number, patients could not be contacted for follow up which was reflected by low participant rates.

There was significant difficulty getting participants' agreement to a home visit by EMS via telephone contact. Several factors that contributed to this were: failure to self-identify as at risk; currently receiving care at the time of phone call (including hospitalization); unable to contact; and no interest in speaking with a representative from EMS. It was also difficult to find one time frame (e.g., one-week post initial EMS call) that could be applied to all patients to call to schedule a follow up. To address these barriers, patients are now to be asked at the time of the field assessment if they would like a follow up and contact information will be obtained for both the patient and their primary caregiver (if possible). This process amendment will hopefully reduce the difficulty in trying to explain the program over the phone and make it easier to schedule a follow up visit.

Conclusion

This program represents a tremendous effort put forth by UNC, Orange County Department on Aging, and Orange County Emergency Services. The historical data and results from the pilot phase of Stay Up and Active demonstrate the need in Orange County for more than simple emergency response to injury and illness. Orange County EMS is in a prime position to provide the falls assessment questions as an integrated part of their services, and must continue implementation of this program as well as address the barriers identified in this report. Furthermore, SUAA represents a national trend for EMS systems to address community needs of their patients and begin to shift resources towards prevention as a means to alleviate the burdens they face. However, with a large aging population, both local and national attention should be given to help individuals safely age in place as a way to help offset future healthcare costs.

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Tables

Year	Total EMS Calls	Lifting Assistance	Falls	Combined Lifting & Falls	Percent Lifting & Falls
2010	9,585	159	984	1,143	11.9%
2011	10,333	101	1,117	1,218	11.8%
2012	10,636	64	1,165	1,229	11.6%
2013	10,983	63	1,182	1,245	11.3%

Table 1. Baseline Falls Data for Orange County Emergency Medical Services (EMS), 2010-2013. (Source: Orange County 9-1-1, 2014).

Total Number of Positive Screenings	Number of Individuals
1	303
2	32
3	10
4	5
5	2
6	1
7	2
8	1
9	1
10	0
11	0
12	0
13	0
14	1

Table 2. Positive Screening Rates for September 1, 2013 through March 31, 2014. (Source: Orange County 9-1-1, 2014).

Figures

Figure 1. WebEOC Flow Chart

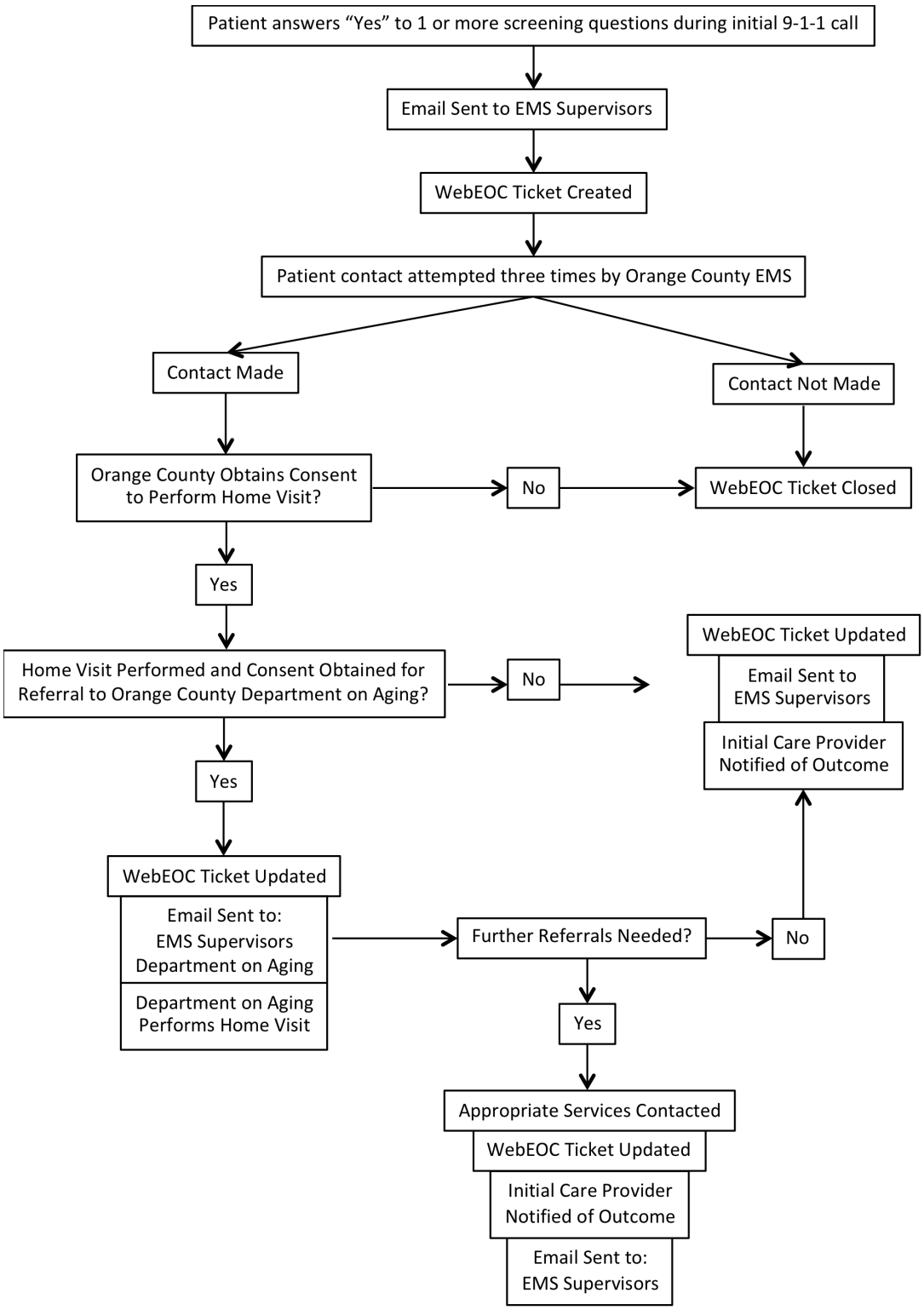


Figure 2. The Mini-Cog

The Mini-Cog:
(appropriate if you think the patient may have cognitive deficits, e.g., can't follow directions, etc.)

Instructions below or link to: http://www.alz.org/documents_custom/minicog.pdf

1. 3 item repeat
2. Clock Draw
3. 3 item recall

3 item repeat

1. Say to the patient*: "I am going to say three words that I want you to remember"*
2. *Say 3 common nouns (banana – sunrise - chair,* village, kitchen, baby, etc.)
3. Then ask: *"Can you say them for me now?"*

If the patient is unable to repeat the words, check box for further cognitive assessment

If they can repeat, go on to the Clock Drawing Test.

Clock drawing

1. Say in order: *"Please draw a clock. Start by drawing a large circle."*
2. when done, say "*Put all the numbers in the circle."*
3. when done, say "*Now set the hands to show 11:10 (10 past 11)."* This part is not a memory test so repeat instructions as needed.

Refusal or inability to draw results in a score of 0, check box for further cognitive assessment

3 item recall

1. Ask: *"What were the three words I asked you to remember?"*

If cannot recall any words, check box for further cognitive assessment

Figure 3. The PHQ-2

<u>The PHQ-2</u> (indicated if you suspect depressed mood)

Instructions below or link to:
http://www.fpnotebook.com/Psych/Exam/PtntHlthQstnr2.htm and follow the II. Questionnaire instructions.

Say to patient:
Please answer yes or no: In the past 2 weeks, have you been bothered by:
Little interest or pleasure in doing things?
Feeling down, depressed or hopeless?

Scoring:
If the patient answers yes to **either** question, check box on screening form for further assessment.

Figure 4. Timed Up & Go

Timed Up & Go (TUG) - conduct as part of mobility screening

You will need a stopwatch or watch with a second hand to time this test.

See instructional video here
http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/videos.html#TUG

Directions: Patients wear their regular footwear and can use a walking aid if needed. Begin by having the patient sit back in a standard arm chair and identify a line 3 meters or 10 feet away on the floor.

Instructions to the patient: *When I say **"Go,"** I want you to:*

Stand up from the chair
Walk to the line on the floor at your normal pace
Turn
Walk back to the chair at your normal pace
Sit down again

"Do you understand? (if yes): Go!
On the word **"Go"** begin timing. Stop timing after patient has sat back down and record the time in seconds: _____

If the patient required > 12 seconds to complete the TUG, check Y on the screening form

If the patient completed the TUG in < 12 seconds, check N on the screening form

Figure 5. 30-Second Chair Stand

30-Second Chair Stand – to test leg strength and endurance

Watch the video
http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/videos.html#Chair

Equipment needed:
• A chair with a straight back without arm rests
• A stopwatch

Say to the patient:
Please sit in the middle of the chair.
Cross your hands across your chest and keep your feet flat on the floor.
Keep your back straight and keep your arms against your chest.
When I say ***"Go,"*** please *rise to a full standing position and then sit back down again.*
Repeat this as many times as you can for 30 seconds.

On **"Go,"** begin timing. Count the number of times the patient comes to a full standing position in 30 seconds. If the patient must use his/her arms to stand, stop the test and record "0" for the number

If the patient is over halfway to a standing position when 30 seconds have elapsed, count it as a stand.

SCORING: represents the threshold for BELOW AVERAGE PERFORMANCE

Patient Age	Men	Women
60-64	<14	<12
65-69	<12	<11
70-74	<12	<10
75-79	<11	<10
80-84	<10	<9
85-89	<8	<8
90-94	<7	<4

If the patient scores below average for age and gender, check Y on the screening tool
If the patient scores at or above average, check N on the screening form

Figure 6. 4-Stage Balance Test Full Tandem Stance

<u>4-Stage Balance Test Full Tandem Stance</u> – to test balance

Watch the video
http://www.cdc.gov/homeandrecreationalsafety/Falls/steadi/videos.html#4Stage
You will need a stopwatch or watch with a second hand.
Say to patient: *"Please stand with one foot directly in front of the other, with the heel of your front foot touching the toe of your back foot."*

It is okay to hold onto the patient to steady them until they get into position. Once they are steady, begin timing. Stay close to provide assistance if balance is lost.

If the patient is unable to hold stance for 10 seconds+, check Y on screening form.
If the patient holds this stance for 10 seconds +, check N on screening form.

Figure 7. Home Environment Assessment

HOME ENVIRONMENT ASSESSMENT

A home-based factor that presents a fall risk for one person may not pose the same risk for another person. Here are some of the common issues that are commonly associated with falling that should be noted on the screening:

Poor lighting
Uneven floor surfaces
Pets or pet supplies/toys
Obstacles in walkways
Rugs without nonskid backing
Lack of railings / grab bars at entryways and in bath
Commonly-needed items places out of reach (phones, cooking utensils, etc)

Figure 8. Orange County EMS WebEOC Board

Falls Prevention Screening Tool EMS Follow Up EMS-Dept on Aging Injury Prevention Coalition Orange County, NC	
Patient Name: Phone #: Address: Lives: CFS: Response Date:	
Information from initial EMS visit: History of Falls? More than 5 Meds? Recent Hospitalization?	History of Substance Abuse? Incontinence? Movement Disorder? Cognitive Decline? Depression?
Initial Falls Screening History: Have you had any falls in the past year? Do you worry about falling? Do you feel unsteady standing or walking?	Medications: Psychoactive medications, OTC meds with anti-cholinergic/sedating side effects? (e.g. Tylenol, Benadryl, Anti-vert)
Secondary Falls Screening History: Have you had any falls in the past year? If so, how many? Do you worry about falling? Do you feel unsteady standing or walking? Do you believe there is anything you can do to reduce your risk of falling? Have you already taken action to reduce your risk of falling? If yes, list actions taken:	Mobility: Timed Up and Go Test more than 12 seconds? 30-Second Chair Stand below average? Full Tandem Stand less than 10 seconds?
Cognitive Screening Positive? Depression Screening Positive?	Vision: Was your last exam more than a year ago? Does the patient have glasses but does not wear them? If yes, list reason(s):
Home Environment: Are there observable safety concerns in the home? If yes, list concerns:	Elder Abuse: Do you fear being hurt by anyone? Has anyone harmed you recently?
Activity Pattern: Have you given up any activities you value due to a fear of falling? Do you need assistance with any personal care (bathing, dressing, toileting)? If yes, are you currently receiving any help with personal care?	Follow Up: Is the patient currently being seen by the Department on Aging? Follow Up from OCES? Date of visit: Follow Up from Department on Aging?
General Notes:	
OCES Personnel:	

Figure 9. Orange County Department on Aging Follow Up Form

OCDoA Follow Up	□ Unable to contact after 3 calls □ Individual refused home visit and any additional visit □ Individual contacted and home visit scheduled □ Individual contacted, refused home visit, but given information over the phone
Home Visit Home Visit Occurred on: _____ Result of home visit (Check Boxes): □ Referral Given □ Info Given □ Pt refused further follow up □ None Needed If pt refused further follow-up, list reason: _____	
Referrals Made □ Counseling □ Pharmacy Review □ Primary Care Provider If Referred to PCP, where: _____ □ UNC or other Geriatric Specialty Clinic □ Caregiver Support Group □ Home modifications recommended □ Senior Center Wellness Center (Exercise/Balance Classes) □ Dept on Aging Case Management □ In-home care services □ Other, please specify: _____	
Department on Aging Interventions Implemented □ Home Safety Assessment Conducted □ Provided In-Home Care Resources □ Provided Durable Medical Equipment □ Home Modifications Completed by OCDoA □ Counseling □ Provided Respite Care	
3 Month Follow-Up: **Status** □ Living at Home □ Moved (out of county, into retirement community community) □ Moved in with family □ Transferred to ___Assisted Living ____Skilled Nursing _____Other □ Deceased **Has the individual attended/completed the following?** □ Counseling □ Pharmacy Review □ Primary Care Provider If Referred to PCP, where: _____ □ UNC or other Geriatric Specialty Clinic □ Caregiver Support Group □ Home Health □ Outpatient Healthcare Services □ Wellness programs	
Any additional comments about this individual, provide below: _____	
Number of EMS calls since Dept on Aging Referral	#
Number of self-reported falls since Dept on Aging Referral	#

Figure 10. Orange County EMS Falls Risk Assessment Standard Operating Guideline (SOG).

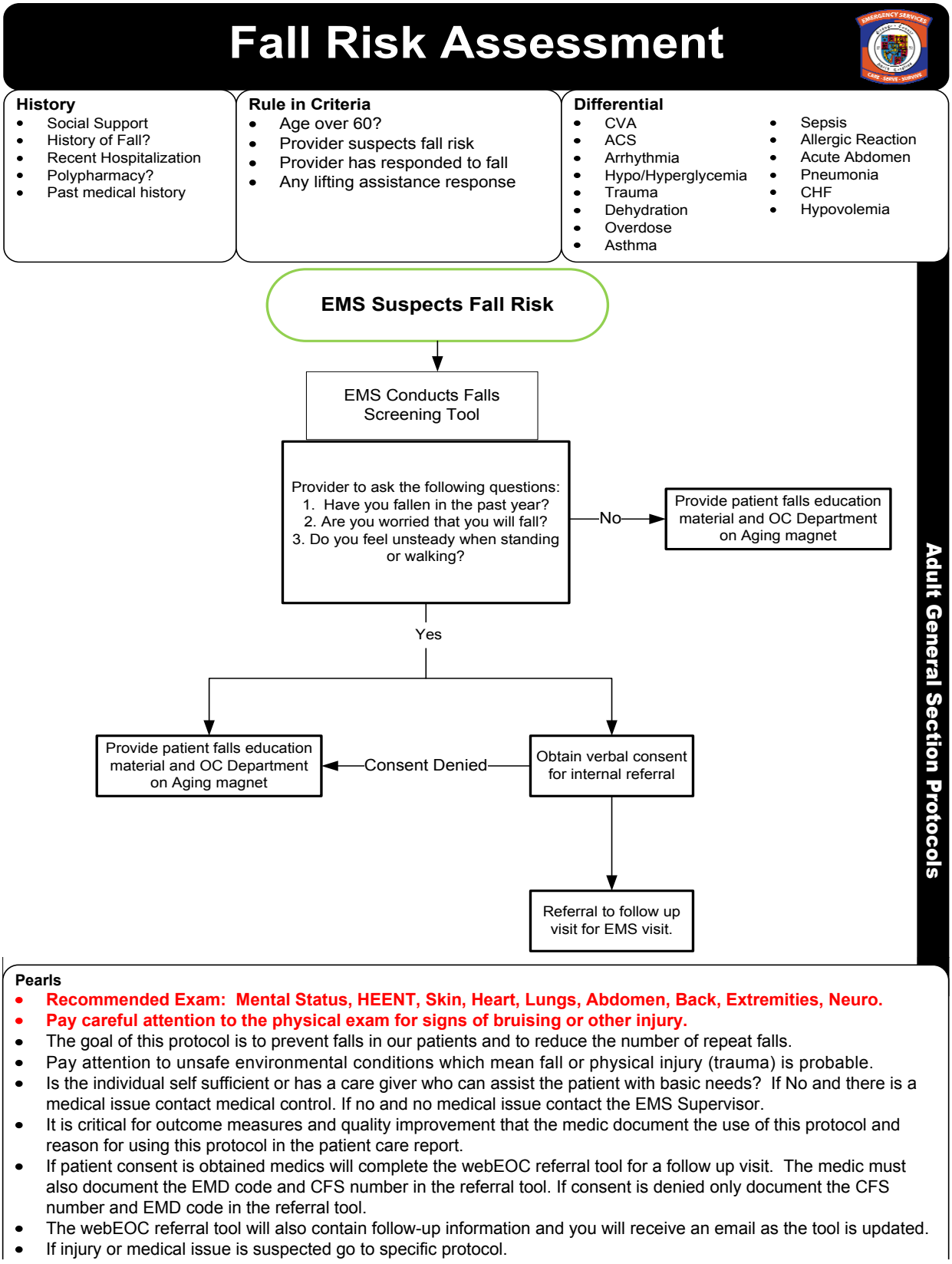
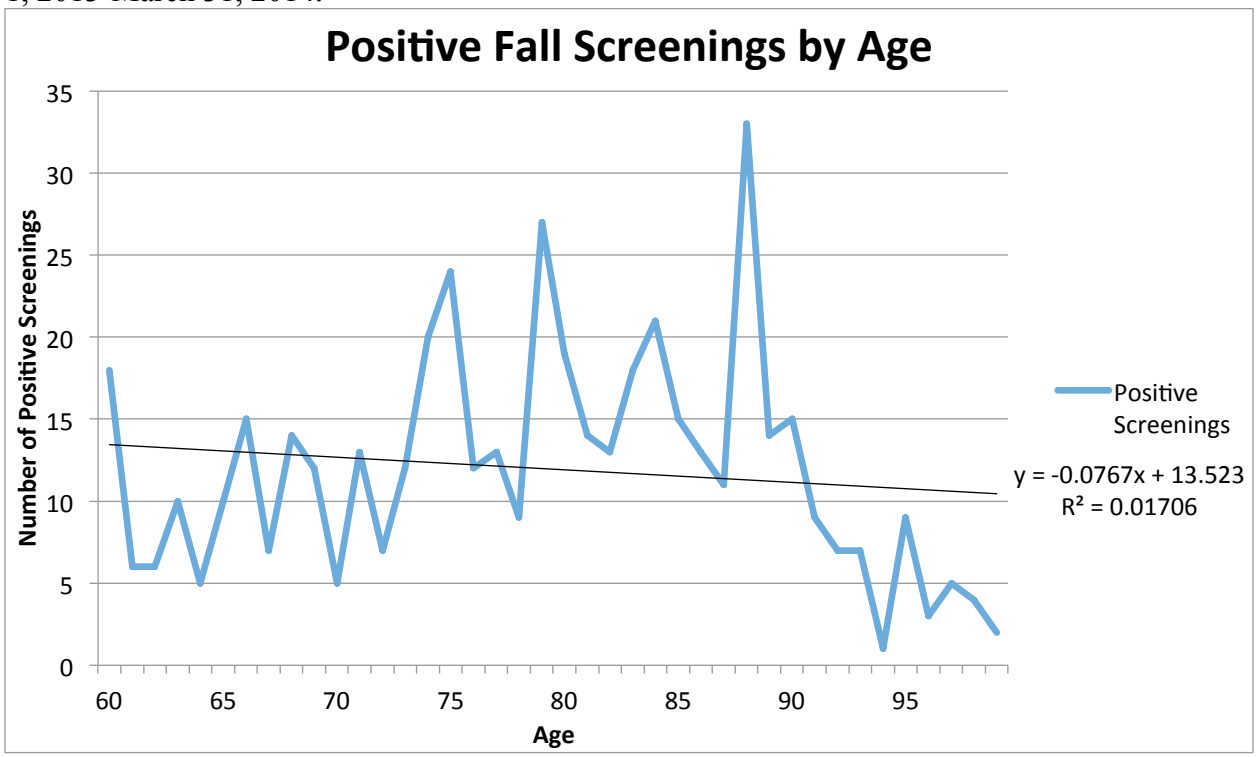


Figure 11. Positive Fall Screenings by Patient Age, Orange County, North Carolina, September 1, 2013-March 31, 2014.



Addendum # 1: Literature Review

Background and Purpose of EMS

The current state of Emergency Medical Services (EMS) in the United States is a direct result of the needs of the people and the ingenuity resulting from the recognition of this need. The skeleton of modern EMS was formed in the France when Dominique Jean Larrey, a field surgeon for Napoleon, developed a method to retrieve wounded soldiers from the battlefield to frontline surgical tents (Shah, 2006). Following Larrey's innovations, soldiers in the American Civil War, World War I, and World War II built upon this structure and continued to make modifications to the system. Civilian medicine missed a tremendous opportunity over the next century, and as late as the 1960's, emergency care, both at the Emergency Department (ED) and in the pre-hospital setting, was severely lacking. There were no training standards, no minimum staffing standards, and no state or federal accreditation standards (Rockwood, Jr., Mann, Farrington, Hampton, & Motley, 1976).

Between 1903 and 1965, there were over 6.5 million deaths attributed to accidents, with 1,690,000 of them due to motor vehicle accidents alone (National Highway Traffic Safety Administration, 1966). Of the approximate 200,000 personnel operating ambulances across the country, only forty-eight percent of them had training equivalent to an advanced Red Cross training (Rockwood, Jr., Mann, Farrington, Hampton, & Motley, 1976). Additionally, only 46% of 26,500 ambulances were equipped to meet the minimum standards as set out by the American College of Surgeons (ACS) (Rockwood, Jr., Mann, Farrington, Hampton, & Motley, 1976). Of these ambulances, over half were being staffed on a regular basis by morticians (National Research Council, 2007). These figures would have continued to rise if not for changes that

supported systems of care in places such as Seattle and Miami in the United States, as well as Korea and Vietnam (Hoffer, 1979).

In 1966 and with these numbers in mind, the National Highway Traffic Safety Administration (NHTSA) took it upon itself to point out the deficiencies in the emergency care field and establish standards and recommendations for practitioners to strive toward (National Highway Traffic Safety Administration, 1966). Commonly known as the "White Paper", the NHTSA produced the spark for national EMS support in the United States with: *Accidental Death and Disability: The Neglected Disease of Modern Society* (National Highway Traffic Safety Administration, 1966). This document pointed out flaws in the system such as inadequate staffing and training, apathy on behalf of the citizens, and a lack of organization amongst all health organizations involved in emergency care (National Highway Traffic Safety Administration, 1966). With the support of the NHTSA, the federal government took major steps in providing funding to further develop the national EMS system with the *Highway Safety Act of 1966* and the *EMS Systems Act of 1973* (National Research Council, 2007).

Even with the recommendations made by the NHTSA, by 1976 only 30-35% of the United States had "adequate" emergency medical services by NHTSA standards (Rockwood, Jr., Mann, Farrington, Hampton, & Motley, 1976). Fortunately, during this period, the importance of several techniques became evident, including defibrillation, cardiopulmonary resuscitation, and therapeutic pharmaceuticals (Shah, 2006). The ACS' Committee on Trauma created training programs, standards, and materials for both ambulance attendants and physicians from the 1960's-1970's, as well as established basic equipment requirements for ambulances (Rockwood, Jr., Mann, Farrington, Hampton, & Motley, 1976). Completing these advances, specialized trauma centers came into existence during the late 1960's, and accreditation standards began to

nationalize. This helped to increase access to care and standardize the level of care that was administered nationwide (Shah, 2006).

Is EMS Actually Being Used as Intended?

The reasons for the creation of the EMS system are still evident today with the need for rapid treatment of acute medical conditions, such as stroke and heart attack, as well as traumas. As EMS systems and providers are faced with increasing populations and call volume, the necessity of both triaging and community outreach, and developing synergies between the efficient use of the two become apparent.

There have been numerous studies that cite the misuse of Emergency Medical Services. Using the National Hospital Ambulatory Medical Care Survey, it was found that in 2004, 23.35% of 5,748 patients transported to the ED via ambulance were categorized as non-emergent patients upon their arrival (Michael, 2007). Extrapolation of these numbers to be representative of the population as a whole, this overutilization of EMS led to an estimated expense of $1.32 Billion on the Medicare system alone (Michael, 2007). In addition, non-acute ambulance transports to the ED have been associated with several factors including older age, the time of the day, homelessness, Medicare or Medicaid insurance payor, as well as certain chief complaints (Durant & Fahimi, 2012). In one urban hospital setting, patients and providers were surveyed as to whether they believed the ambulance transport was an emergency or not an emergency. In this study, providers and patients agreed 75% of the time on the necessity, or lack thereof, for ambulance transport. The study concluded that there are patient characteristics that complement proper and improper use of the EMS system, including level of education, shortness of breath, age, and Medicare insurance payor (Ferrall & Richards, 1999). Additional evidence of misuse of resources in the emergency care setting is found in the increasing number EMS

transports from nursing facilities to the ED for elderly patients for non-acute conditions (Wofford, Schwartz, & Byrum, 1993). There are numerous disadvantages to elderly patients utilizing the ED as a primary care facility, and, as a result it is important for EDs to identify high-risk populations and provide patient outreach in order to affect a change in the inadequate primary care being provided at these facilities (Wofford, Schwartz, & Byrum, 1993).

In spite of the findings from Wofford and colleagues, other studies have shown that EMS based case management of frequent users of the EMS and hospital systems can reduce the time and cost burden on both institutions (Tadros, et al., 2012). While this system explored by Tadros et al. has a population of 1.3 million, much more than Orange County, the results showed that ED visits were fewer after intervention as were hospital admissions, leading to reduced health care expenditures for a small, regular portion of the population (Tadros, et al., 2012). It has been argued, however, that paramedics should not be responsible for determining whether patients go to the hospital or not (Brown, et al., 2009). Despite possible negative findings, there is strong evidence that there needs to be some form of coordinated care at the level of the EMS system in order to reduce the burden of these known populations on the EMS system as well as local hospitals. EMS systems coordination of care will prevent citizens from relying on the frequently more expensive, lower quality, and less coordinated care that comes from relying on EDs for primary care (Tadros, et al., 2012).

Community programs led by EMS agencies have begun to gain traction nationwide. The problem associated with this initiative is that it is difficult to replicate efforts from community to community due to varying demographics, available resources, and unmet needs (White & Wingrove, 2012). The benefits to implementing an EMS-based community program, however, are numerous and include reduced unit times, increased coordinated primary care, and reduced

burden on ED beds and services (White & Wingrove, 2012). Over the next decade, the focus of EMS providers and managers is going to have to reflect a shift in the traditional style of doing things, by taking the lead in coordination of community programs, or they will see a continuous burden on resources and costs.

Other EMS Models to Address Falls

Falls prevention has been a focus point for EMS agencies since the mid-1990's. With the advent of computerized EMS records, the potential exists to perform surveillance and removes the reliance on collaboration with local hospitals to have usable data (Wofford, Heuser, Moran, Schwartz, & Mittelmark, 1994). In addition to the benefits that come from streamlined data collection, EMS providers are generally the first point of contact in the patient care process and are best poised to collect accurate, non-diluted histories and accounts (Wofford, Heuser, Moran, Schwartz, & Mittelmark, 1994). In addition to the data collection and information sharing, it is in the best interest of EMS systems to collaborate with local agencies to offer complementary services to the population (Ganz, Alkema, & Wu, 2008). While time and resources go into to the preparation of materials and staff allocations, both the EMS unit utilization times reduction and reduced morbidity of the population will prove well worth the efforts.

Unfortunately, there has not been much progress made in the monitoring and evaluation nor prevention fields when it comes to falls. There have been tremendous strides made in risk assessment, treatment, therapy, and follow-up; however the actual reduction in the incidence of falls may be lower than previously thought (Ganz, Alkema, & Wu, 2008). There are small successes supporting the need for the development of an intervention by the EMS Division. One service in the United Kingdom coordinated follow up for a random group of patients whose age was 60 or more to community falls prevention services. This study reported a dramatic reduction

in falls using a simple diary to track fall events and also reported a significant difference in ambulance calls between the intervention group and control group (Logan, et al., 2010). An analysis of "Lift Assistance" type calls—where a patient is simply unable to get themselves up—over a five year span revealed that about two thirds of all calls were to one third of the addresses and most repeat calls occurred within a thirty day period (Cone, Ahern, Lee, Baker, Murphy, & Bogucki, 2013). This strengthens the argument for rapid intervention on behalf of the community of first responders as serving as the initial contact to perform a straightforward falls risk assessment as part of the patient assessment in the field.

The Problem of Falls

In a prospective cohort study that examined the rates of falls amongst persons over 70, it was found that within a six month period, 145 (58%) of 262 participants experienced a total of 488 falls after an initial ambulance visit that resulted in a non-transport to a hospital (Tiedemann, Mikolaizak, Sherrington, Segin, Lord, & Close, 2013). This study found that the following factors increased a person's risk of a repeat ambulance visit: three or more falls in the previous year; inability to perform personal care without assistance; and the inability to walk for 10 minutes without rest (Tiedemann, Mikolaizak, Sherrington, Segin, Lord, & Close, 2013). While this is a study performed in New Zealand, many of the factors contributing to a person's risk of falling are universal and are not necessarily location dependent. The subjects from the Tiedemann et al. study, along with the population they represent, are at tremendous risk for not only injury from a secondary fall, but also suffering from an underlying chronic condition. The concerns that these figures raise are only amplified for emergency management administrators when the geriatric population in the United States is expected to account for over fifty percent of all EMS calls by 2030 (Shah, Swanson, Nobay, Peterson, Caprio, & Karuza, 2013). In addition

to the multiple comorbid factors that affect the geriatric population, EMS providers are generally inadequately trained to properly manage medical needs specific to this population (Shah, Swanson, Nobay, Peterson, Caprio, & Karuza, 2013). While EMS providers are trained to national standards, most reported feeling uncomfortable in their ability to care for older adults due to the limited population specific training received during their education (Shah, Swanson, Nobay, Peterson, Caprio, & Karuza, 2013).

Falls not only put a strain on EMS personnel and resources, but also pose a significant burden on ED's throughout the world. As standard EMS practice dictates, those patients that fall are transported to the hospital unless they refuse. The result of this practice is that approximately one-fifth of all ED visits by older adults are fall victims transported by EMS providers (Mikolaizak, et al., 2013). While the obvious solution to this problem would suggest a reduced transport rate for fall victims, there is still very limited data on the safety and health outcomes of patients that are not transported to the hospital as a result of a fall (Mikolaizak, et al., 2013). Furthermore, an additional major risk of falls in older populations, traumatic spinal cord injury (TSCI), has been on the rise since the 1990s and is one of the greatest risks associated with the non-transport of an older falls patient (Selvarajah, et al., 2014). In 1999 alone, falls among persons over 60 accounted for 204,424 hospital admissions throughout the United Kingdom, costing the government approximately £981 million (Sach, et al., 2012). The economic evaluation performed by Sach and colleagues showed that a community falls prevention program not only provided cost savings benefits to the government, but also helped improve health outcomes for citizens. They reported that those individuals that received the intervention had an average of five fewer falls in a twelve month period as compared to the control group (Sach, et

al., 2012). Therefore, the time and economic resource burden on hospitals, EDs, and EMS due to falls in persons over 60 justifies the development of community falls prevention programs.

Appendix 2: Justification for Community Paramedicine Program

Orange County Emergency Services serves approximately 134,000 citizens of Orange County, NC as well as the 30,000 students of the University of North Carolina and 10,000 UNC Hospitals employees. The county can anecdotally be divided into halves by the Interstate-40 corridor. Northern Orange County includes the areas of Hillsborough, Efland, Cedar Grove, Mebane, and some of Durham City. Citizens of northern Orange County are classified as a rural demographic group and are affected by the same health disparities that are visible in rural counties throughout North Carolina. Along with the demographic differences in age and socioeconomic status, the citizens in the north section are less served by community services and represent an at risk group, compared to those in Southern Orange County that includes Chapel Hill and Carrboro.

Orange County Emergency Services is responsible for providing help and support to citizens and visitors of Orange County during times of personal and large-scale emergencies. This department is also responsible for the coordination of services provided by the various agencies throughout the county, providing support during day-to-day operations and also for large scale events. Orange County Emergency Services has four main areas of focus: Emergency Management, Fire Marshall Division, Telecommunications, and Emergency Medical Services (EMS). The EMS Division provides between five and eight Advanced Life Support ambulances to Orange County 24 hours a day. These ambulances respond to 9-1-1 emergencies and serve both the urban and rural areas of the county.

While Orange County Emergency Services is taking the lead to institute the Community Paramedicine Program, collaboration among other supporting county departments is paramount for success. These supporting departments include Social Services, Housing, Health, Child

Support, and Aging. By engaging with staff and integrating resources from other departments, the Community Paramedicine Program has the potential to serve all 134,000 residents of Orange County. For instance, the Stay Up and Active Program, an active collaboration among agencies, screened a total of 478 EMS patients who were 60 and older and at risk for falling, in less than seven months. This successful collaboration demonstrates a need for services to be provided by Orange County to its citizens, and expanding upon the success of Stay Up and Active, the Community Paramedicine Program will target even more at risk individuals and families including those homeless persons that are not served by the area shelters, those individuals battling mental health illness, those persons found to be frequently relying on 9-1-1 for medical transport to a hospital, and school age children who, along with their families, may have limited knowledge of emergency preparedness. Through education efforts, coordinated services delivery, and community involvement, this program will attempt to improve the lives of those that are currently struggling.

The goal of the Community Paramedicine Program is to develop and implement a unique method for education and service delivery that can be a model for other county EMS agencies throughout the State of North Carolina. While Orange County may be unique in that there are two major hospital systems (UNC and Duke) that serve the population, it is not unique in that there are demographic differences throughout the county. The more urban southern half of the county is population dense and has many nursing facilities, doctors offices, and support services available to the population, but still sees many homeless, mentally ill, and disabled individuals. Orange County EMS is very well positioned to provide ongoing monitoring of these persons in order to help coordinate care services. Conversely, the citizens in Northern Orange County comprise a rural demographic and have little access to the same public transportation options and

services than their counterparts; consequently, there is increased difficulty for older individuals to make doctors appointments and receive follow up after hospitalizations.

As the program develops, the various plans utilized will be documented and provided as "Toolkits" so that other counties throughout the state can see what has been done in Orange County, what worked, what did not work, and learn from these experiences. There are demographic pockets across the entire state that are represented in Orange County. From citizens living in rural farm land to those living in assisted care facilities, there is a tremendous amount of impact this program can have on both the county and the state.

Program Description

The base of the Community Paramedicine Program exists as a result of collaboration between many entities working in Orange County to find solutions to problems. As a result, team work has produced a very successful pilot program that demonstrates the need for strong and continued community outreach and addressing the needs of high risk demographic groups.

Paramedics and first responders are frequently the first people in the chain of care that a patient receives when experiencing a medical emergency. Responders are in the patients' homes and are given a unique perspective to their lives that hospital and office based caregivers are not afforded. As such, these providers are the most adequately positioned to be able to obtain thorough histories from patients and provide the most accurate information to future care providers. The Community Paramedicine Program leverages this ability to coordinate care for certain high risk population groups. Given the resources that currently exist in Orange County and the previous experience with community outreach programs, the Community Paramedicine Program's infrastructure is partially in place through the reporting and monitoring abilities available to EMS. This program can utilize models in existence rather than start from scratch,

saving both time and money. We have reexamined previously established but cancelled programs for continuity and have changed the models to ensure sustainability.

One of the primary initiatives of the Community Paramedicine Program will be to ensure that the Stay Up and Active Program has the necessary materials and programming to make it sustainable. Currently, EMS providers screen adults over 60 for their risk of falling at the time of patient contact. If the patient answers "yes" to one or more of the screening questions, the Patient Care Report is flagged after submission and pulled for review during a weekly report. These patients are contacted by Orange County EMS personnel via telephone for a follow up home visit where a thorough assessment of the patient's current status is made. Assessments are made of the patient's cognitive ability, agility, balance, mood, as well as their current medical status and home environment. All of these results are recorded and, pending the patient's consent, provided to the Orange County Department on Aging (OCDoA) who then provide further follow up with the patient. The OCDoA is able to provide referrals to low cost services such as occupational therapy, physical therapy, home health aid, public transportation options and are also able to provide physical hardware installation for the patient's home such as hand rails, bathroom aids, and anything to help with independence in their home.

During the implementation phase of the Stay Up and Active Program, several barriers were encountered. One barrier centered on the follow-up call after the 9-1-1 support. Due to factors as hospital admission, ongoing care post discharge, and repeat falls, managing appropriate timing for an EMS follow up phone call with the patient was difficult. As a result, changes have been made to the program plan and EMS providers will obtain consent on-scene (when reasonable) from the patient for an EMS follow-up visit. This will enable easier scheduling of EMS follow up visits and allow a greater number of visits to be performed.

Another barrier that was encountered was the low self-identification by patients as being at risk for falls and the stigma that goes along with admitting this risk. This barrier caused low participation in the beginning and changes were made to the script to emphasize the goal to keep citizens healthy in their home and prevent further injuries. Finally, several small systems based barriers were encountered such as email links that did not work or forms that had bad links, but these were unmasked in the early stages and corrected. Despite these barriers, all patients that received a follow up visit from Orange County EMS requested follow-up from the Department on Aging. Members of the team are actively meeting on a regular basis to evaluate the program, discuss the barriers that are found, and come up with solutions for improvement. Additionally, having recently participated in the North Carolina Falls Prevention Summit, Orange County is well positioned to work with the Falls Prevention Coalition at the State level and represent the area.

Orange County EMS has the backing of the Medical Director's Office to pursue the Community Paramedicine Program and has directed the Division to develop several areas needing special attention in addition to continuing the Stay Up and Active Program. Some of these areas include post surgical discharge follow-up for patients in rural Orange County; case management of homeless citizens utilizing EMS; EMS case management of frequent users of the 9-1-1 system; citizens battling mental illness and coordinating appropriate care when appropriate; and providing education to school aged children. Furthermore, with the recent mental health settlement by the Department of Justice, approximately 2,000 mental health residents will be matriculating into various North Carolina counties and Orange County anticipates seeing several future residents as a result of this ruling and the availability of health care centers in and around the county.

Frequent repeated use of the 9-1-1 system represents a larger problem than having a preexisting medical condition. In most cases this represents an underlying socioeconomic barrier to the person receiving appropriate care due to lack of insurance, lack of transportation, or any number of other barriers. Whatever the cause, any person that calls for an ambulance four or more times in a thirty day period will be contacted by the Community Paramedicine Program for follow up. An assessment of current health status, living conditions, and other potential factors playing a role in the patient's current condition will be performed. This information will then be used to contact appropriate resources determined necessary to ensure the patient receives the care they need, and are protected from themselves, and any other identified potential risk factor.

High risk refusals and patients with mental health illness (whether chronic or presenting as an acute emergency) constitute a considerable amount of ambulance unit hour use that can be alleviated by a dedicated responder that can spend the time to either find other care options for the patient or give dedicated time to these patients to provide the proper care. Such high risk refusals include patients requesting a well-being check, with a non-medical complaint, and Law Enforcement Assist calls, in addition to many others. By using a Community Paramedic to assist with these patients, front line ambulances can be cleared sooner to respond to other potential emergencies. This group constitutes a small quantity of patients that require a high degree of care and coordination in their treatment plan. While few in number, they pose some of the greatest legal and physical risks to EMS providers and law enforcement officials.

The current problem that makes it difficult to have one model Community Paramedicine Program that can be utilized state-wide is that each county has different needs, different resources, and different geography. With this in mind, the best solution is to provide those with unmet need with the most appropriate resources possible to better help them develop a solution.

These solutions will be made available by Orange County Emergency Services and will detail the demographic population served, the program plan, and evaluation plan. Any additional materials and examples of resources given to citizens will also be included for modeling purposes. There is a change taking place nationally to push for more EMS-centric community programs and providing as many options as possible will promote the development of a community program that is right for them.

Past Performance

Orange County Emergency Services has provided several community outreach programs in the past years. Past initiatives have included the "Welcome to the World" program which provided materials and information to new parents upon bringing their newborn home from the hospital. These meetings were performed by on-duty EMS crews and were well received by community members that received the service. Unfortunately, this program ended as the Orange County EMS system became increasingly busy and had increased personnel constraints. A second initiative provided medical status monitoring of homeless persons residing in Orange County. This program used EMS personnel and resources to report when a participant of the program was transported to the hospital or had an interaction with EMS. Follow-up consults were performed by EMS crews after discharge from the hospital and participants were tracked for trends in their health over time. This program also provided these individuals with medical information packets and basic care items such as blankets in the winter and toiletries. Again, due to personnel constraints and an ever increasing demand on the Orange County 9-1-1 system, this program had to be tabled until such time that the personnel resources were available to restart the effort. The take home message from the previous initiatives in Orange County, and with all public health initiatives, is that there needs to be a coordinated approach that has dedicated

resources and staff to ensure the sustainability and success of the program. The groundwork is already laid for the Community Paramedicine Program to be a success in Orange County and this success can and will inspire other EMS systems throughout North Carolina to develop programs of their own, along with the model solutions that Orange can provide.

Appendix 3: IRB Approval Notification

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

OFFICE OF HUMAN RESEARCH ETHICS
Medical School Building 52
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Chapel Hill, NC 27599-7097
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Federalwide Assurance (FWA) #4801

To: Tiffany Shubert
Aging Program

From: Office of Human Research Ethics

Date: 9/16/2013
RE: Determination that Research or Research-Like Activity does not require IRB Approval
Study #: 13-2942

Study Title: Evaluation of "Stay Up And Active", A collaborative initiative between the Orange County Department on Aging and Emergency Medical Services

This submission was reviewed by the Office of Human Research Ethics, which has determined that this submission does not constitute human subjects research as defined under federal regulations [45 CFR 46.102 (d or f) and 21 CFR 56.102(c)(e)(l)] and does not require IRB approval.

Study Description:

Purpose:The purpose of this project is to evaluate qualitative and quantitative outcomes of the "Stay Up and Active" (SUA) project. This project is a collaboration between the Orange County Department on Aging (DOA) and the Orange County Emergency Medical Services (EMS). The purpose of the project is to connect older adults at risk of falling to services provided through the DOA. The role of UNC in the project is to evaluate SUA in the following areas: 1) Number and type of EMS "falls calls"; 2) Perception and impact of the program on older adult participants; 3) Perception and impact of the program on EMS/DOA employees

Participants: 1) Older adults who agree to participate in the program; 2) EMS/Dept on Aging Employees responsible for implementing the program

Procedures (methods):

1) Collection of de-identified falls calls data

2) Phone interviews of older adults

3) Focus groups of EMS/Dept on Aging employees

If your study protocol changes in such a way that this determination will no longer apply, you should contact the above IRB before making the changes.

CC:
Jan Busby-Whitehead, Medicine

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